

CSU Long Beach
Dept. of Math and Statistics

MATH 581: Exp. Design and Analysis

OUTPUT #2

The GLM Procedure

Class Level Information

Class	Levels	Values
height	3	bot mid top
width	2	reg wide

Number of observations 12

Dependent Variable: sales

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	1580.000000	316.000000	30.58	0.0003
Error	6	62.000000	10.333333		
Corrected Total	11	1642.000000			

R-Square	Coeff Var	Root MSE	sales Mean
0.962241	6.303040	3.214550	51.00000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
height	2	1544.000000	772.000000	74.71	<.0001
width	1	12.000000	12.000000	1.16	0.3226
height*width	2	24.000000	12.000000	1.16	0.3747

Source	DF	Type III SS	Mean Square	F Value	Pr > F
height	2	1544.000000	772.000000	74.71	<.0001
width	1	12.000000	12.000000	1.16	0.3226
height*width	2	24.000000	12.000000	1.16	0.3747

Tukey's Studentized Range (HSD) Test for sales

Alpha	0.05
Error Degrees of Freedom	6
Error Mean Square	10.33333
Critical Value of Studentized Range	4.33902
Minimum Significant Difference	6.974

Tukey Grouping	Mean	N	height
A	67.000	4	mid
B	44.000	4	bot
B	42.000	4	top

Bonferroni (Dunn) t Tests for sales

Alpha	0.05
Error Degrees of Freedom	6
Error Mean Square	10.33333
Critical Value of t	3.28746
Minimum Significant Difference	7.4725

Bon Grouping	Mean	N	height
A	67.000	4	mid
B	44.000	4	bot
B	42.000	4	top

Scheffe's Test for sales

Alpha	0.05
Error Degrees of Freedom	6
Error Mean Square	10.33333
Critical Value of F	5.14325
Minimum Significant Difference	7.2902

Scheffe Grouping	Mean	N	height
A	67.000	4	mid
B	44.000	4	bot
B			
B	42.000	4	top

Tukey's Studentized Range (HSD) Test for sales

Alpha	0.05
Error Degrees of Freedom	6
Error Mean Square	10.33333
Critical Value of Studentized Range	3.46046
Minimum Significant Difference	4.5413

Tukey Grouping	Mean	N	width
A	52.000	6	wide
A			
A	50.000	6	reg

Bonferroni (Dunn) t Tests for sales

Alpha	0.05
Error Degrees of Freedom	6
Error Mean Square	10.33333
Critical Value of t	2.44691
Minimum Significant Difference	4.5413

Bon Grouping	Mean	N	width
A	52.000	6	wide
A			
A	50.000	6	reg

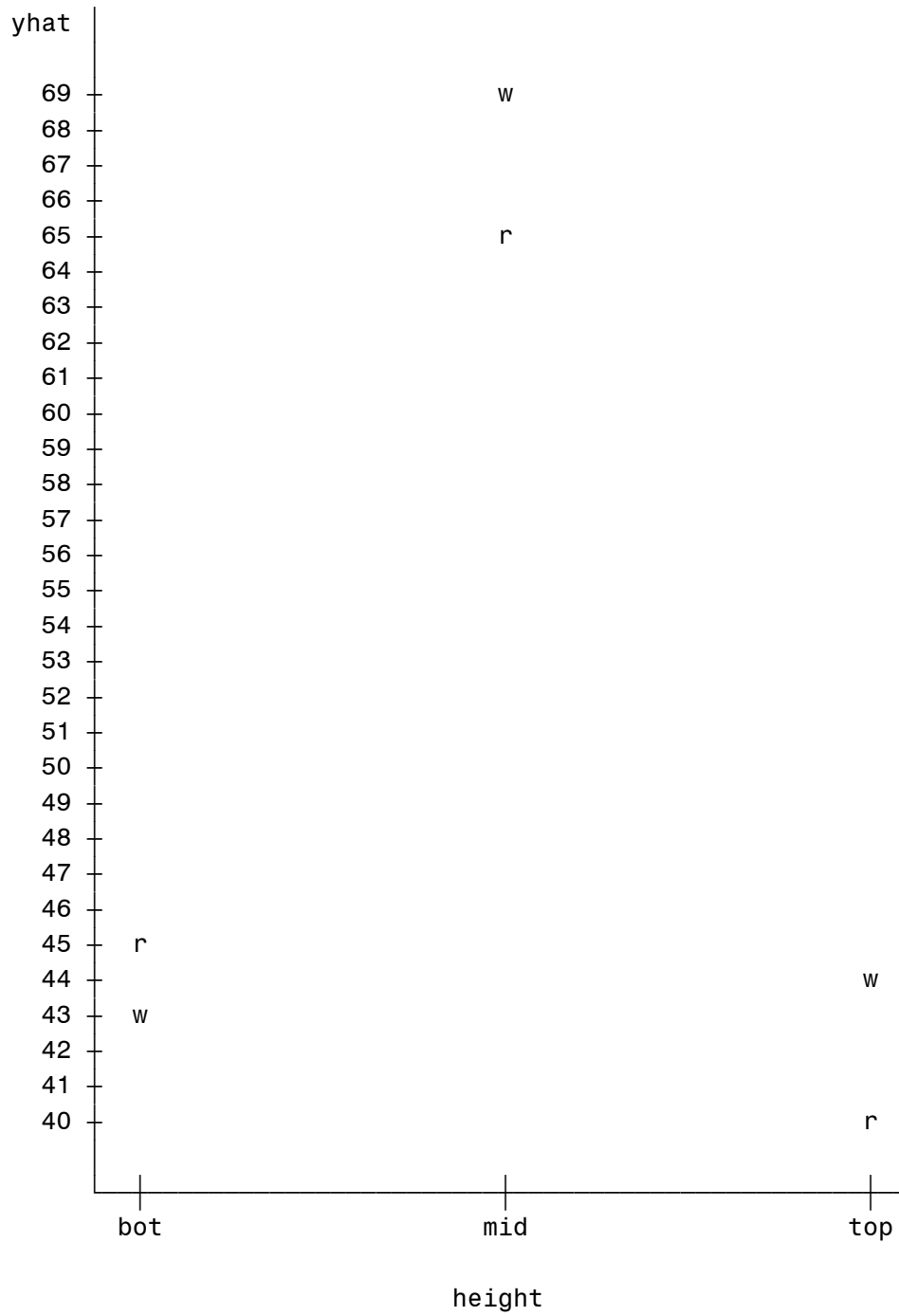
Scheffe's Test for sales

Alpha 0.05
 Error Degrees of Freedom 6
 Error Mean Square 10.33333
 Critical Value of F 5.98738
 Minimum Significant Difference 4.5413

Scheffe Grouping	Mean	N	width
A	52.000	6	wide
A			
A	50.000	6	reg

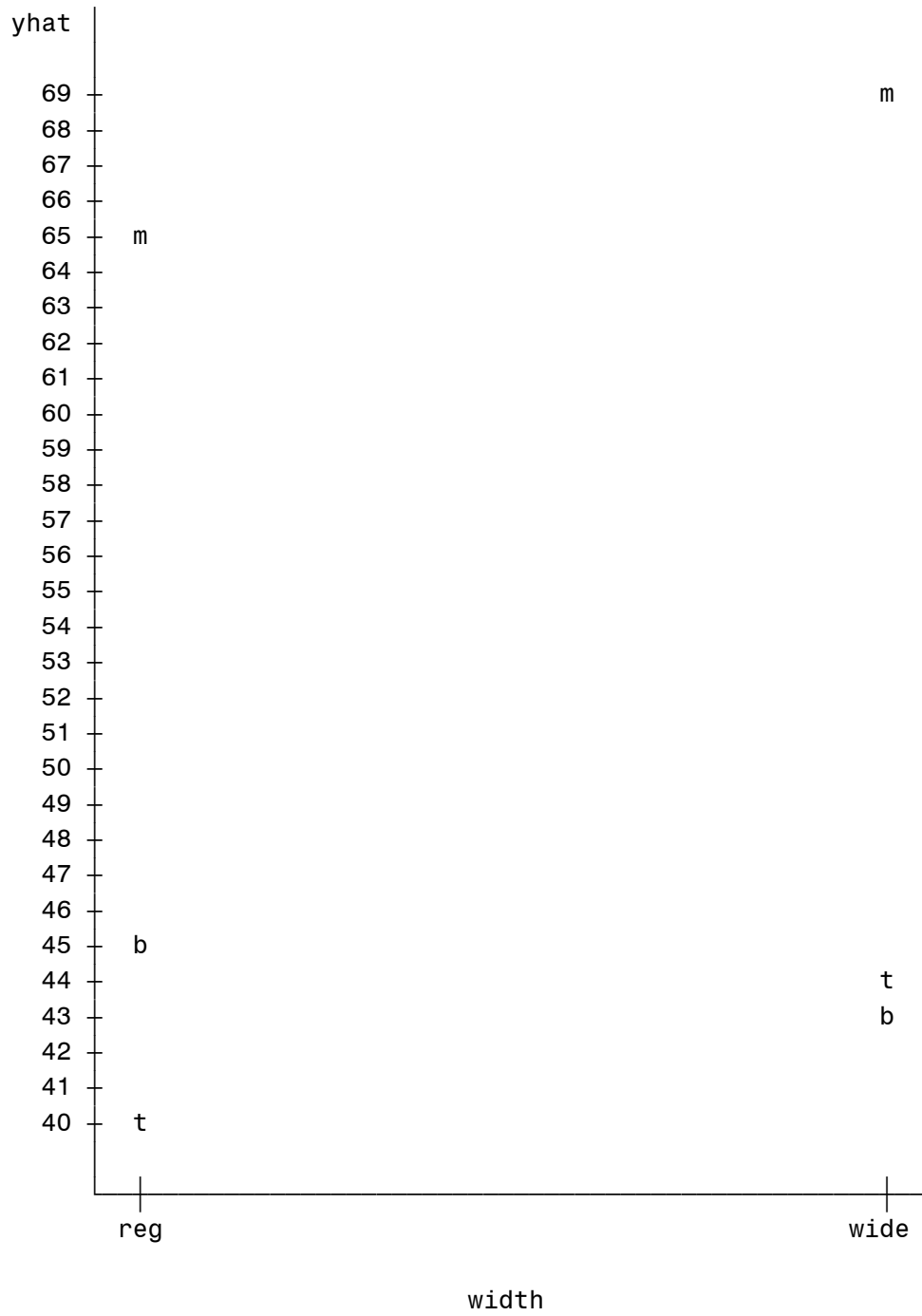
Level of height	Level of width	N	-----sales----- Mean	Std Dev
bot	reg	2	45.0000000	2.82842712
bot	wide	2	43.0000000	4.24264069
mid	reg	2	65.0000000	4.24264069
mid	wide	2	69.0000000	2.82842712
top	reg	2	40.0000000	1.41421356
top	wide	2	44.0000000	2.82842712

Plot of \hat{y} *height. Symbol is value of width.



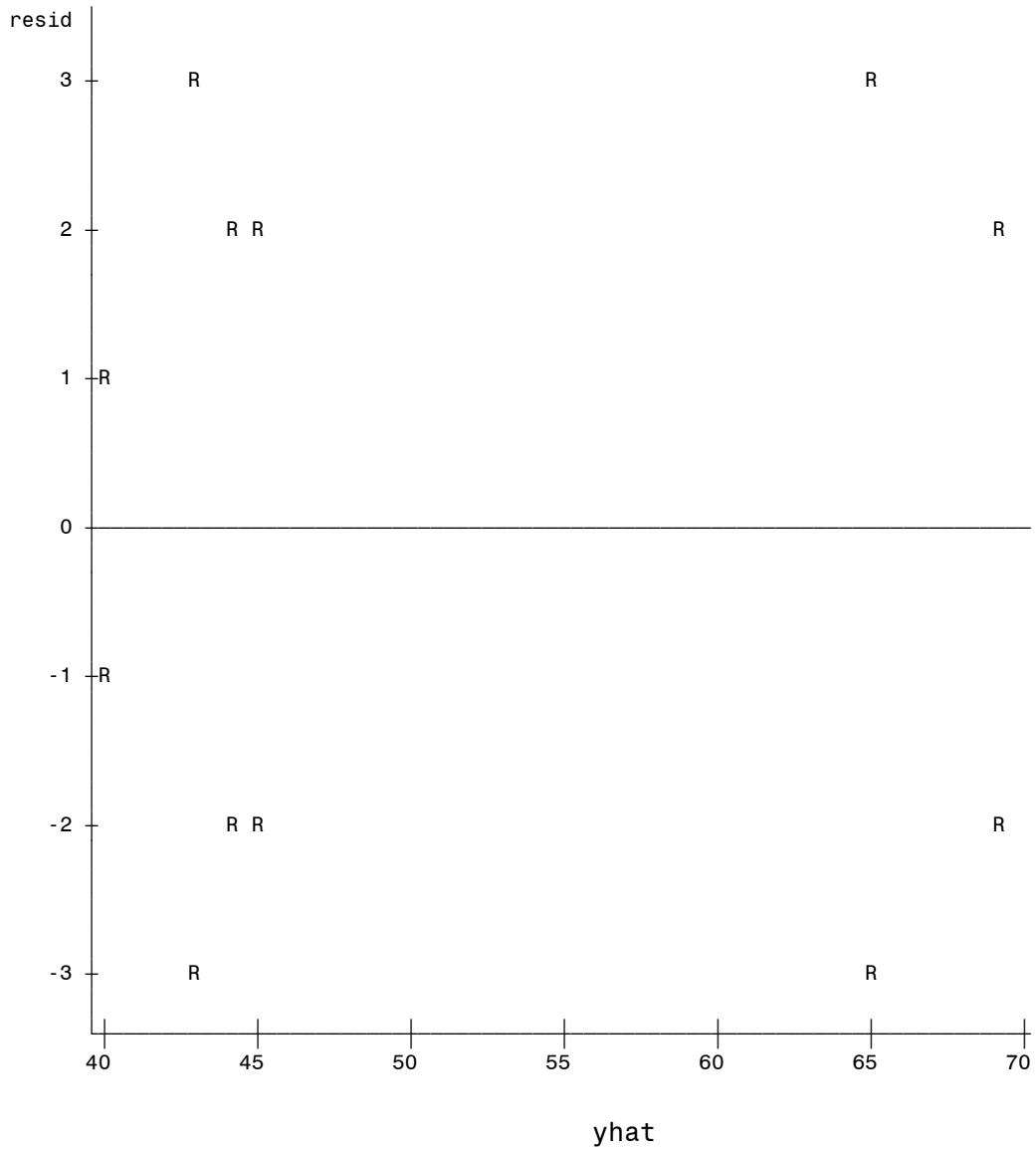
NOTE: 6 obs hidden.

Plot of $\hat{y} \times \text{width}$. Symbol is value of height.



NOTE: 6 obs hidden.

Plot of resid*yhat. Symbol used is 'R'.



The UNIVARIATE Procedure
Variable: resid

Moments

N	12	Sum Weights	12
Mean	0	Sum Observations	0
Std Deviation	2.3741027	Variance	5.63636364
Skewness	0	Kurtosis	-1.9401665
Uncorrected SS	62	Corrected SS	62
Coeff Variation	.	Std Error Mean	0.68534442

Tests for Location: Mu0=0

Test	-Statistic-	-----p Value-----		
Student's t	t	0	Pr > t	1.0000
Sign	M	0	Pr >= M	1.0000
Signed Rank	S	1.5	Pr >= S	0.9355

Tests for Normality

Test	--Statistic--	-----p Value-----		
Shapiro-Wilk	W	0.855765	Pr < W	0.0433
Kolmogorov-Smirnov	D	0.216891	Pr > D	0.1189
Cramer-von Mises	W-Sq	0.123447	Pr > W-Sq	0.0471
Anderson-Darling	A-Sq	0.729045	Pr > A-Sq	0.0430

The UNIVARIATE Procedure
Variable: resid

Quantiles (Definition 5)

Quantile	Estimate
100% Max	3.00000E+00
99%	3.00000E+00
95%	3.00000E+00
90%	3.00000E+00
75% Q3	2.00000E+00
50% Median	-7.10543E-15
25% Q1	-2.00000E+00

10%	-3.00000E+00
5%	-3.00000E+00
1%	-3.00000E+00
0% Min	-3.00000E+00

Extreme Observations

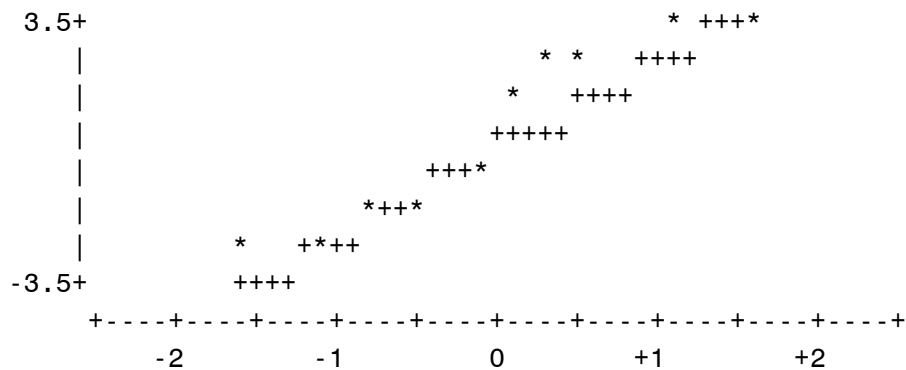
----Lowest----		----Highest---	
Value	Obs	Value	Obs
-3	5	2	12
-3	4	2	1
-2	11	2	8
-2	7	3	3
-2	2	3	6

Variable: resid

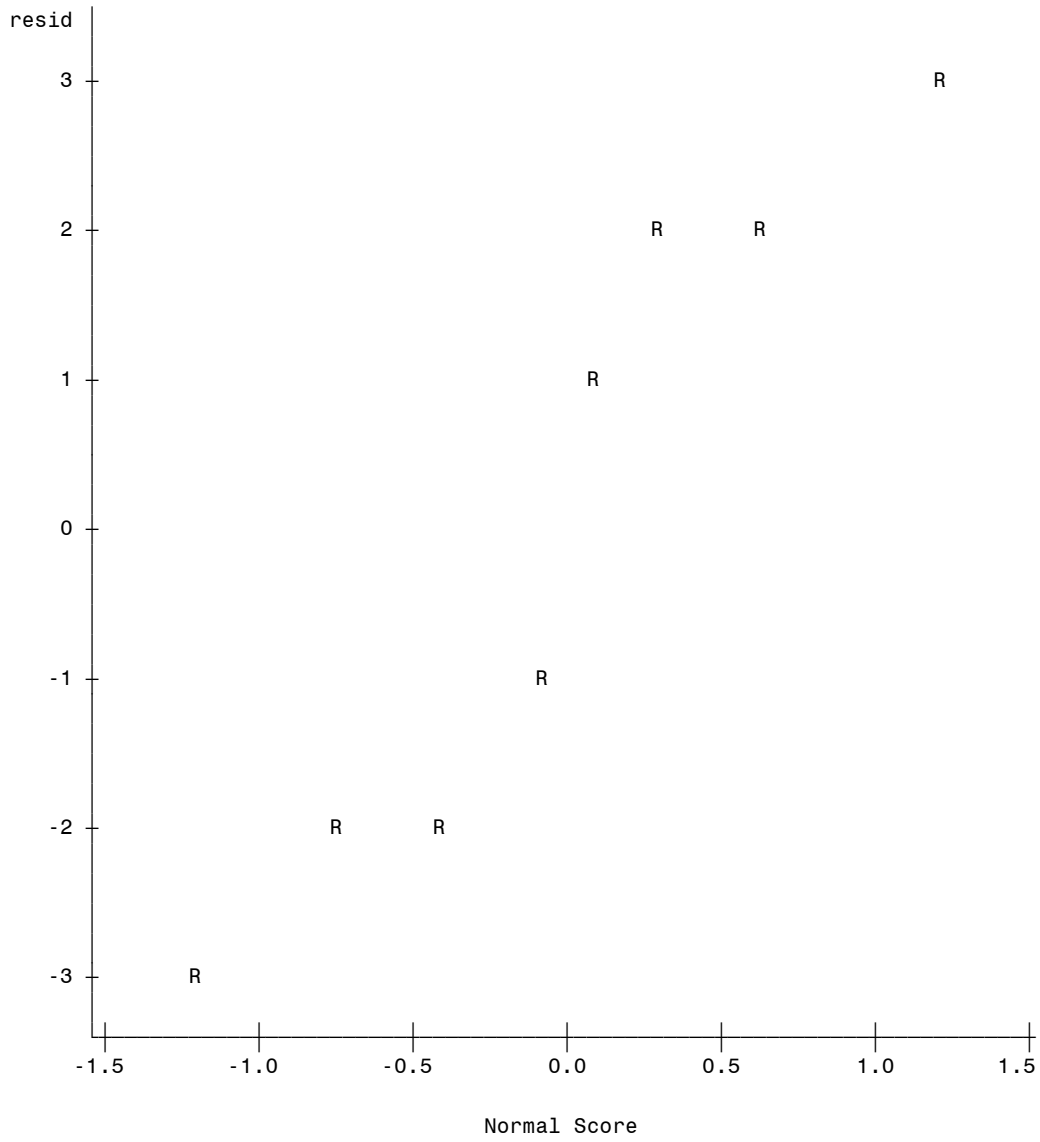
Stem Leaf	#	Boxplot
3 00	2	
2 000	3	+-----+
1 0	1	
0		*-+--*
-0		
-1 0	1	
-2 000	3	+-----+
-3 00	2	

-----+-----+-----+-----+

Normal Probability Plot



Plot of resid*nscore. Symbol used is 'R'.



NOTE: 4 obs hidden.

The CORR Procedure

2 Variables: resid nscore

Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
resid	12	0	2.37410	0	-3.00000	3.00000
nscore	12	0	0.83744	0	-1.22308	1.22308

Simple Statistics

Variable Label

resid
nscore Rank for Variable resid

Pearson Correlation Coefficients, N = 12
Prob > |r| under H0: Rho=0

	resid	nscore
resid	1.00000	0.96015 <.0001
nscore Rank for Variable resid	0.96015 <.0001	1.00000

Contrast	DF	Contrast SS	Mean Square	F Value
Regular Width only (bottom vs.mid)	1	400.0000000	400.0000000	38.71
Wide Width only (bottom vs.mid)	1	676.0000000	676.0000000	65.42

Contrast	Pr > F
Regular Width only (bottom vs.mid)	0.0008
Wide Width only (bottom vs.mid)	0.0002